ABSTRACT

The upper electrode of a capacitor is constituted of laminated films which act to prevent hydrogen atoms from reaching the capacitor electrodes and degrading performance. In one example, a four layer upper electrode respectively acts as a Schottky barrier layer, a hydrogen diffusion preventing layer, a reaction preventing layer, and an adsorption inhibiting layer. Therefore, the occurrence of a capacitance drop, imperfect insulation, and electrode peeling in the semiconductor device due to a reducing atmosphere can be prevented. In addition, the long-term reliability of the device can be improved.